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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

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☐ *Additional inventors are being named on the ___ separately numbered sheets attached hereto*

5535 U.S.PTO 60/541218 020204

TITLE OF THE INVENTION (280 characters max)

Sanding Apparatus

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ENCLOSED APPLICATION PARTS *(check all that apply)*

☒ Specification *Number of Pages* 11
☒ Drawing(s) *Number of Sheets* 7
☐ Application Data Sheet. See 37 CFR 1.76
☐ CD(s), Number
☐ Other (specify)

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT

☒ Applicant claims small entity status. See 37 CFR 1.27.
☐ A check or money order is enclosed to cover the filing fees
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The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.
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Respectfully submitted,

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Date 2/02/04

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REGISTRATION NO. *(if appropriate)* 32,132

TELEPHONE 313-885-1500

Docket Number: 04004.009

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SANDING APPARATUS

TECHNICAL FIELD

This invention relates to a sanding apparatus, and more particularly to an improved sanding apparatus usable for a wide variety of sanding and grinding applications.

BACKGROUND OF THE INVENTION

It is known in the art relating to sanders that sanders have many shortcomings. First, it is known that when sanding a floor, sanders are not capable of sanding close to walls without causing damage to the walls. Usually a drum sander is used to sand a floor and it cannot be brought close to a wall during operation. This makes it necessary to use a separate tool to sand the edges of the floor. Second, conventional sanders do not have enough power to be able to grind surfaces such as hardwood floors, cement, marble, and concrete. Third, it is known that conventional sanders poorly suck sanding waste away and also undesirably allow false air to be sucked into the vacuum stream. Fourth, it is known that rotary grinders leave unwanted circular marks on floors. Fifth, it is known that when sanding or grinding a surface, especially when using a coarse and/or wide disc, that the sanding machine pulls away from the operator across the surface being sanded. Sixth, it is difficult to change a pad located

underneath a sander because it is awkward to flip and stabilize the machine. Seventh, conventional sanding machines do not allow the user to control the speed of the machine, and therefore the sanding machines are not capable of being used to sand a variety of surfaces.

SUMMARY OF THE INVENTION

The present invention provides a sanding apparatus that solves the disadvantages of conventional sanders and can be used to sand a variety of surfaces. The sanding apparatus includes a high power, high speed motor. The high speed motor is geared down through gearing that allows the sander to sand hard surfaces at lower rpm. The sanding apparatus also includes a speed reducer, such as a rheostatic device, that allows the speed of the high speed motor to be varied in order to sand a variety of surfaces. The sanding apparatus further includes an improved handle that prevents the sander from walking when used by an operator and also is rotatable to allow for easy changing of sanding pads. The sanding apparatus further includes an improved backing pad that prevents the formation of circular marks on the sanded surface. Moreover, the sanding apparatus includes a controlled suction system that sucks up all of the sanding waste material while not allowing false air to be sucked into the vacuum stream. The sanding apparatus also includes a guide ring that allows an abrasive mounted on the backing pad to come within one millimeter of a wall adjacent

a floor surface being sanded without causing damage to the wall.

A sanding apparatus in accordance with the present invention includes an elongated frame having a handle end and a work end. The handle end is arranged for operator control of the apparatus while the working end includes means for sanding or grinding. The handle end includes controls for controlling the sanding means at the work end of the apparatus. A stabilizer is located between the handle end and the work end of the sander. The stabilizer includes a spindle acting as an axis of rotation for at least one wheel, rubber roller, or other friction means. The wheels/rollers are rotatable about the spindle. The stabilizer is orbital about the elongated frame. The elongated frame may be made of tubing and used as a means of communicating vacuum and sanding waste.

The work end of the sanding apparatus further includes a housing that functions both as a suction housing and a gear housing. A suction means is operatively connected to the housing. A motor is mounted on top of the housing. A backing pad for mounting an abrasive thereon is operatively, drivingly connected to the motor through the gear housing. A guide ring is mounted to an end of the housing opposite the motor and circumscribes the backing pad.

The housing may be constructed of aluminum or other suitable rigid material. The guide ring extends to the edge of the backing pad. The edge of the guide ring may be a hard steel blade. The guide ring allows the work end of the sanding apparatus to come within one millimeter of a wall adjacent a floor being sanded without causing damage to the wall and without requiring subsequent edge sanding.

In one embodiment, a center section of the backing pad is removed. For example, the backing pad may be a 16 inch in diameter circular pad. Approximately a 7 ½ inch in diameter circle would therefore be removed from the center of the pad. Likewise, the same portion of an abrasive pad that is attached to the backing pad may also be removed. This design prevents the sanding apparatus from marking a sanded surface with circular marks.

In an operative embodiment, a spindle goes through the gear portion of the housing into the suction portion of the housing. A crown gear is disposed within the gear housing. The motor may be a small but powerful 3 ¼ horsepower motor operatively connected to a gear that drives the crown gear. The motor rotates at about 6,500 RPM and the gearing in the housing reduces this to about 900 RPM. The crown gear is operatively connected to the backing pad, the motor thereby driving the backing pad through the crown gear. This combination makes the sanding apparatus powerful enough to be able to grind hardwood floors, cement, marble, and concrete.

The controls at the handle end of the sanding apparatus include a speed reducer, a master power on/off switch, and a safety shutoff device. The speed reducer operates as a rheostat and further allows the speed of the backing pad to be adjusted from between 900 RPM to 100 RPM. The speed reducer uniquely makes it possible for the sanding apparatus to grind all types of surfaces.

The stabilizer is attached to the elongated frame by a securing means such as a clamp or a lock pin. The stabilizer is preferably attached to the elongated frame closer to the work end than the handle end. The wheels/rubber rollers of the stabilizer grip and hold to a sanding surface to stabilize the sanding apparatus and to prevent it from walking/running away from the operator. The wheels/rollers may rotate around the spindle, and may slide from side to side, to allow the operator to move the sanding apparatus in any direction. The wheels/rollers also allow the sanding apparatus to partially move off the edge of a sanding surface without the sanding apparatus leaning to a side.

The stabilizer also acts as a support device to aid an operator when mounting, removing, or changing a sanding pad. To change a sanding pad, an operator releases the securing means holding the stabilizer to the elongated frame. The operator then pushes down on the handle end to lift the work end of the sanding apparatus off the ground. The operator

then rotates the handle end of the frame 180 degrees, thereby flipping the work end so that the pad underneath the housing is easily accessible. The operator may then add an abrasive pad to the backing pad, remove an abrasive pad from the backing pad, or swap the abrasive pad attached to the backing pad for another abrasive pad. After changing the abrasive pad, the operator rotates the handle end 180 degrees, allows the work end of the sanding apparatus to rest on the ground, and tightens the securing means to resecure the stabilizer to the frame.

The backing pad has a plurality of evenly spaced suction holes close to the perimeter of the pad equidistant from the center of the pad. The backing pad further has another set of evenly spaced suction holes closer to the center of the pad that are also themselves all equidistant from the pad center. The abrasive sanding/grinding pads are also themselves made with the identical pattern of suction holes. The suction holes of the backing pad and the abrasive pad are lined up so that all surface particles are sucked up by the suction means no matter what the surface particles are (eg., cement, wood, marble, etc.). This suction system does not allow false air to be sucked in because the suction chamber of the housing forces all of the suction into the suction holes. The suction holes are spaced at such a distance from each other that as the abrasive pad sands a surface, thereby creating sanding waste, the particles are sucked in through the holes into the suction chamber.

This suction system keeps the sanded surface as well as the air surrounding the workspace dust-free at all times by instantly sucking the dust as it is being formed. This also allows the abrasive pad to cut new surface and prevents the abrasive from becoming clogged or plugged. This also prevents the formation of marks in the sanded surface while keeping the abrasive clean and not allowing the creation of heat. If the dust particles were not sucked up immediately, the sanding apparatus would drive the dust particles in circles and would clog up the abrasive pad. This suction system leads to the finest finish on a sanded surface without leaving scratch marks.

The suction chamber is also permanently attached to the backing pad in such a way that no false air can be sucked into the chamber. If all the suction is forced through the suction holes, the suction means could suck the backing pad and attached abrasive pad to the sanding surface with such a force as to stop the pad from spinning. Therefore, side holes are added to the side of the backing pad to allow air to flow in outside of the edge of the backing pad, creating extra suction outside the edge of the pad. This prevents the suction means from being choked down.

Furthermore, the backing pad may be equipped with a hook and/or loop securing means. Various intermediate pads may then be provided that

also are equipped with cooperating hook and/or loop securing means on one or both sides. The intermediate pad attaches to the backing pad and the abrasive pad is attached to the intermediate pad. The intermediate pads are produced of various materials such as rubbers, medium type sponges, and soft sponges. The material for the intermediate pad depends on the abrasiveness of the pad being used. For example, if an operator chooses to use a coarse pad, then a harder rubber intermediate pad would be used. If the operator wants to use a finer abrasive pad, then he would use a soft sponge intermediate pad.

Three or more bolts may be inserted into threaded aperatures or nuts disposed in the backing pad. The bolts may then hold any abrasive pad such as a 16 inch large fiber disk used to cut surfaces such as marble. The bolts in general make it possible to use 16 to 24 grit resin cloth and any other coarse abrasives due to the powerful hold of the abrasive pad to the backing pad.

The bolts are placed near the edge of the circle of the backing pad. An abrasive pad may be aligned with the backing pad with the use of locating pins. The locating pins align the suction holes and the bolts. The bolts hold heavy abrasive pads to the backing pad in situations such as grinding cement or marble when the hook and loop securing means is inadequate. The bolts, when secured, pull themselves into the backing pad along with the abrasive pad.

The bolts are long enough to pass through the abrasive pad, the rubber intermediate pad and into the nuts secured to the backing pad. The bolt heads are sucked into the rubber of the intermediate pad and therefore cannot touch the surface to be sanded. The abrasive pad, thereby secured, cannot move on the backing pad or destroy the alignment of the suction holes.

An operator may also attach six industrial diamond wheels to the large wheel of the apparatus to efficiently cut marble perfectly straight wet or dry.

These and other features and advantages of the invention will be more fully understood from the following detailed description of the invention taken together with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a perspective view of a sanding apparatus in accordance with the present invention;

FIG. 2 is a perspective view of a stabilizer of the apparatus of FIG. 1;

FIG. 3 is a perspective view of a handle end of the apparatus of FIG. 1;

FIG. 4 is a perspective view of a work end of the apparatus of FIG. 1;

FIG. 5 is another perspective view of a stabilizer of the apparatus of FIG. 1;

FIG. 6 is a perspective view of the apparatus of FIG. 1 wherein an operator has pushed down on the handle end to lift the work end of a sanding surface;

FIG. 7 is a perspective view of the apparatus of FIG. 1 wherein the elongated frame has been rotated 180 degrees about the stabilizer to expose an abrasive pad attached to a backing pad of the apparatus;

FIG. 8 is a perspective view of the apparatus of FIG. 1 wherein the abrasive pad has been removed to reveal the backing pad;

FIG. 9 is a perspective view of another backing pad;

FIG. 10 is a perspective view of other backing pads;

FIG. 11 is a perspective view of locating pins inserted into a backing pad;

FIG. 12 is a perspective view of a backing pad and an abrasive pad with locating pins inserted therethrough; and

FIG. 13 is a sectional elevational view of the housing in accordance with the present invention.

Although the invention has been described by reference to a specific embodiment, it should be understood that numerous changes may be made within the spirit and scope of the inventive concepts described. Accordingly, it is intended that the invention not be limited to the described embodiment, but that it have the full scope defined by the language of the following claims.

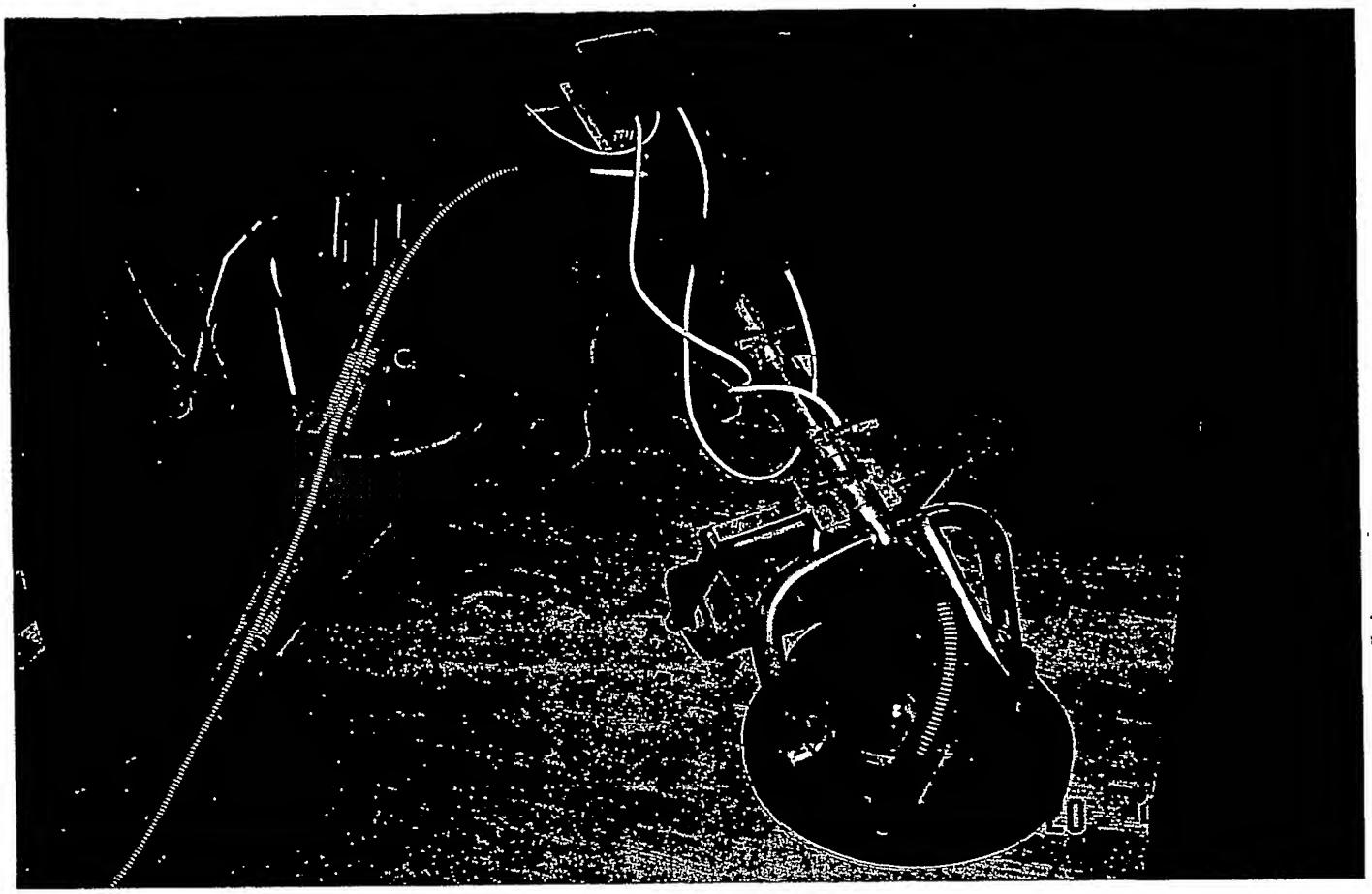
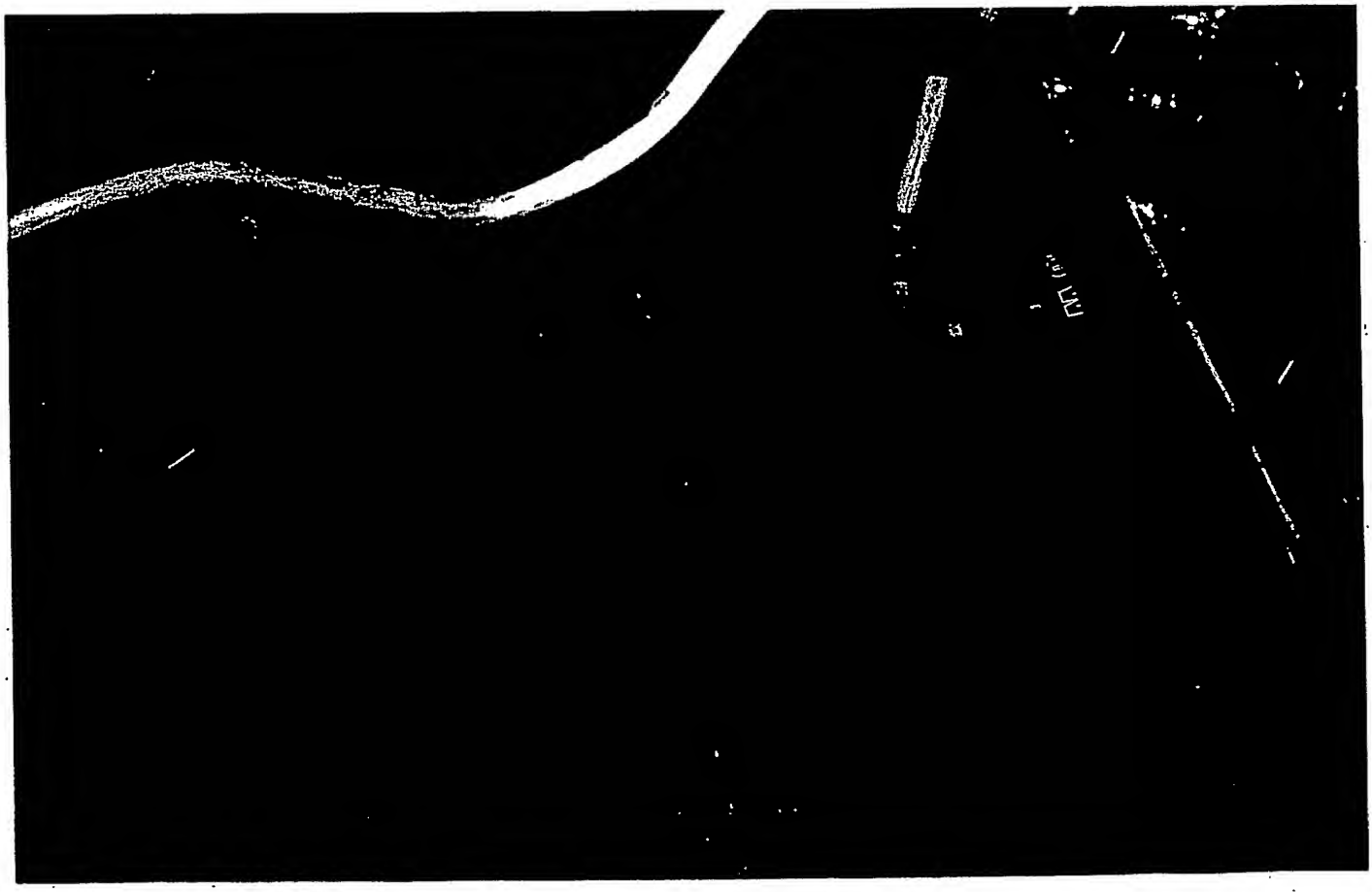


Fig. 1



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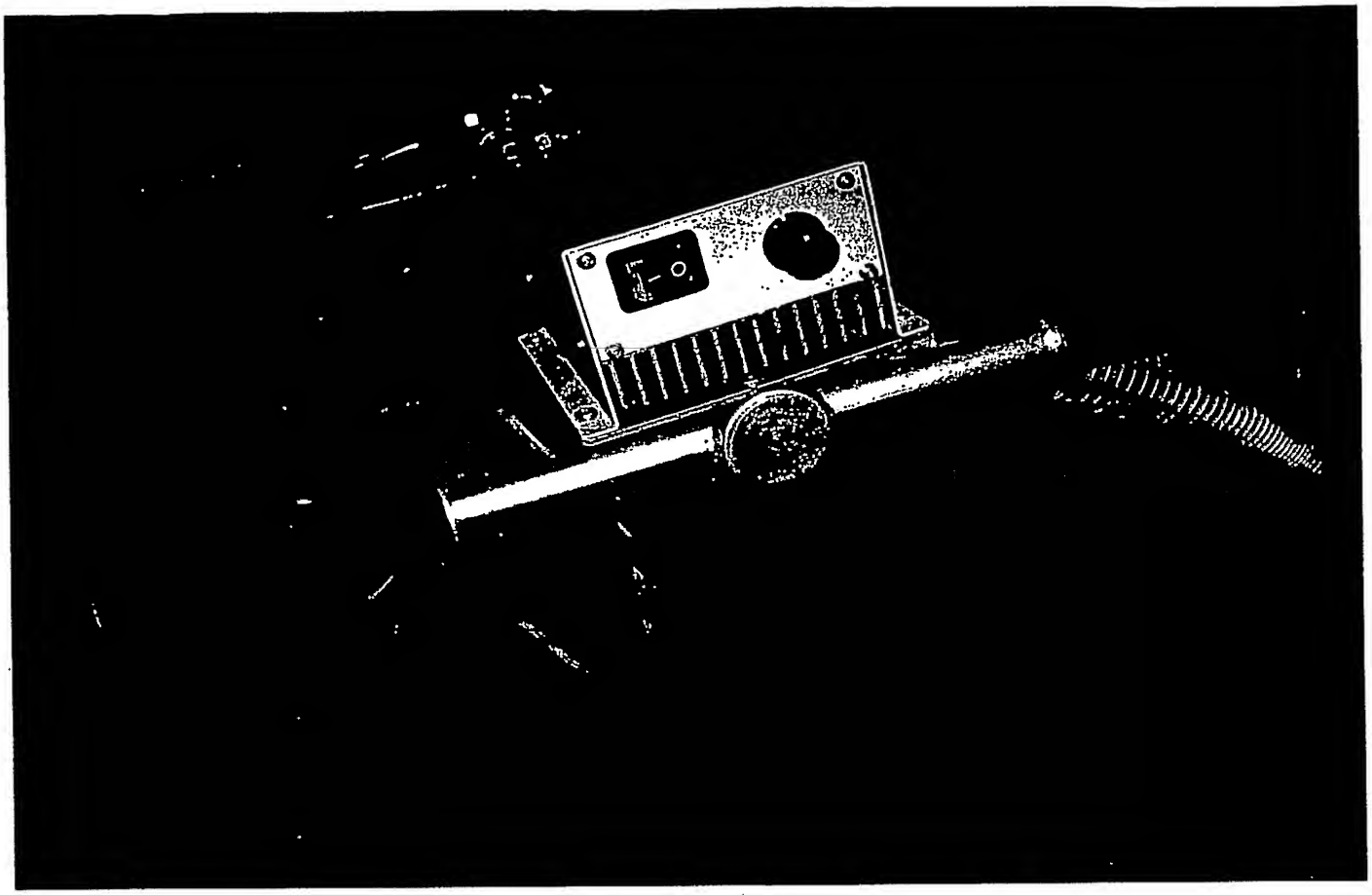

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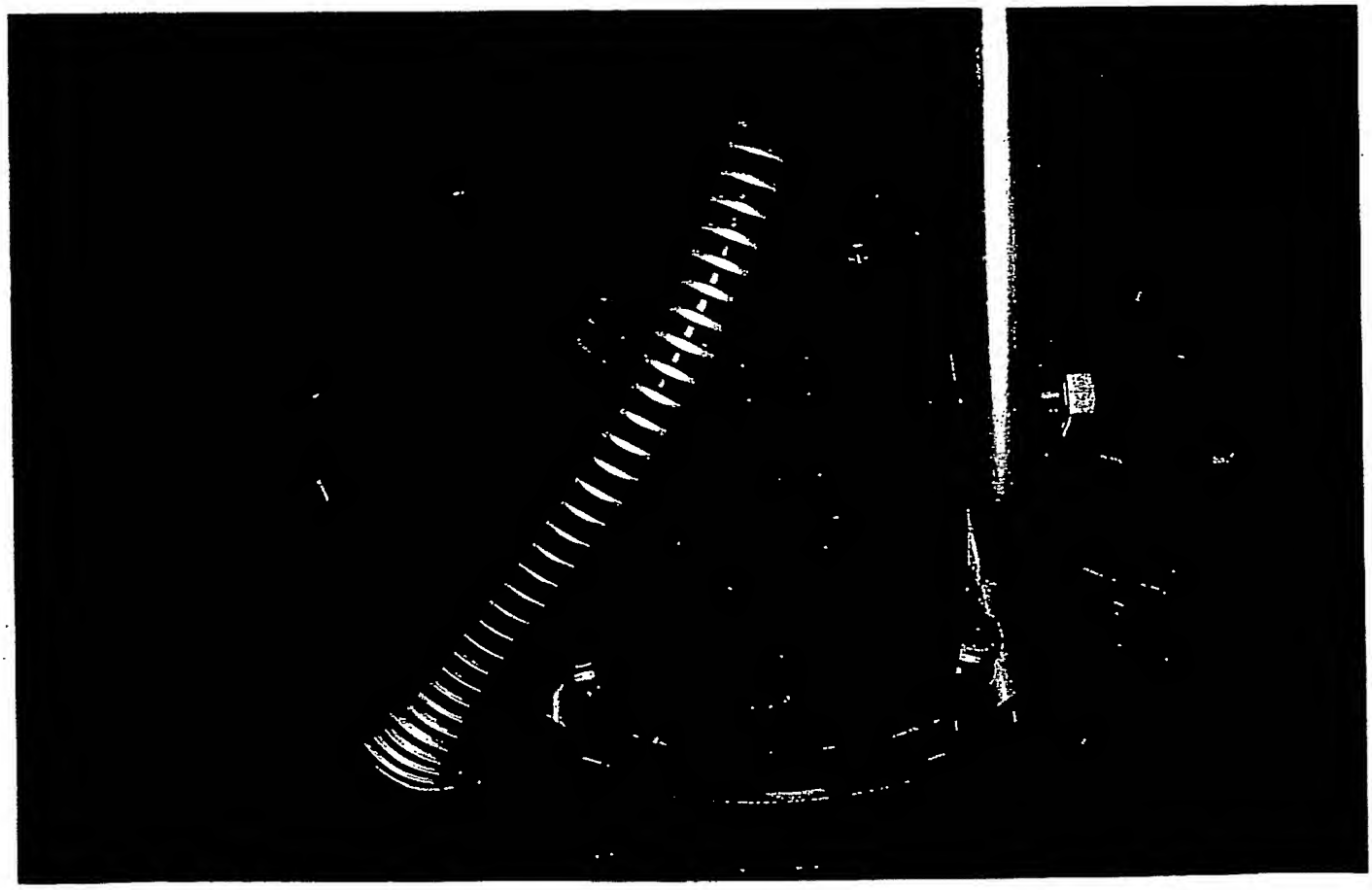

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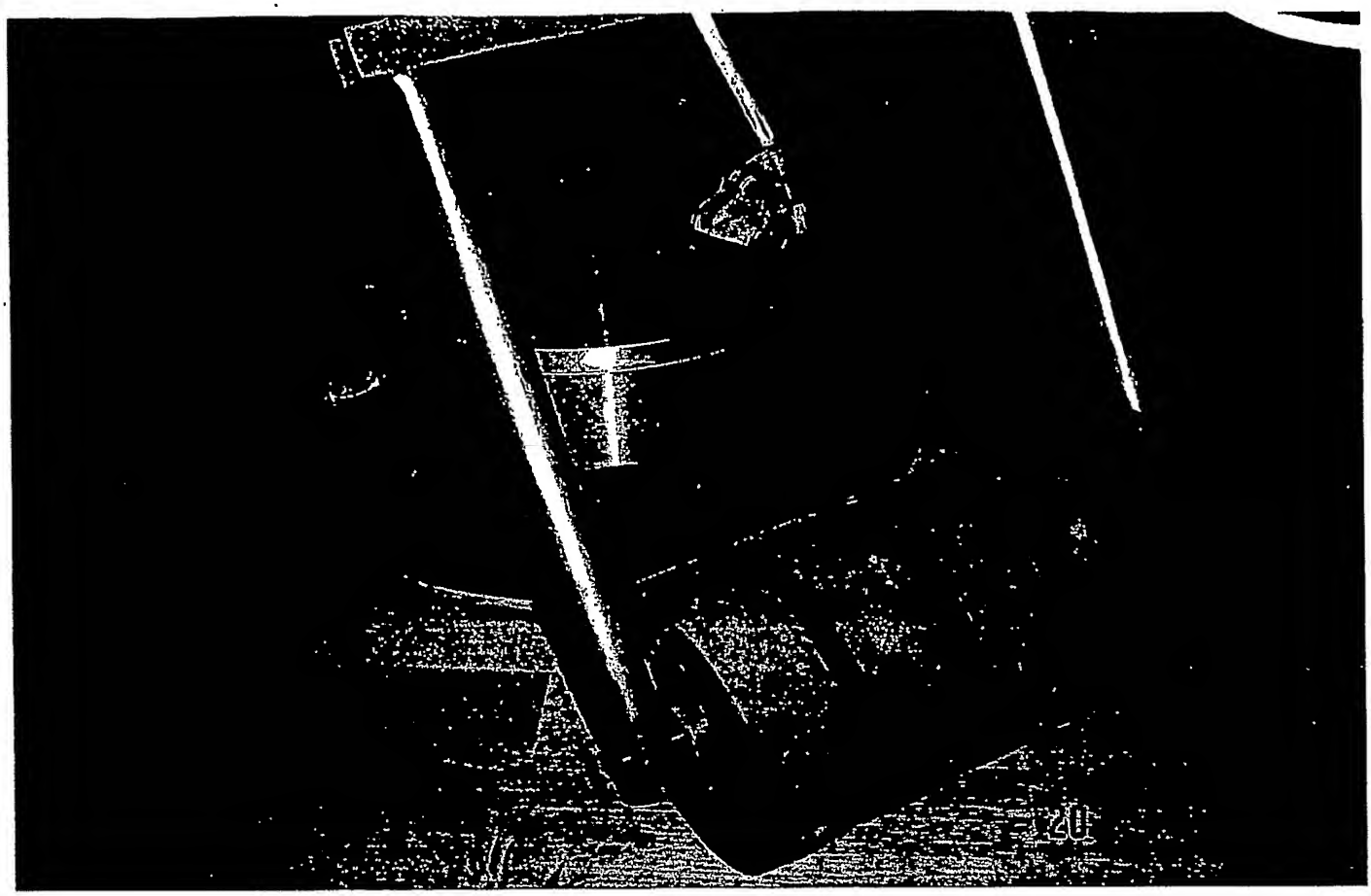

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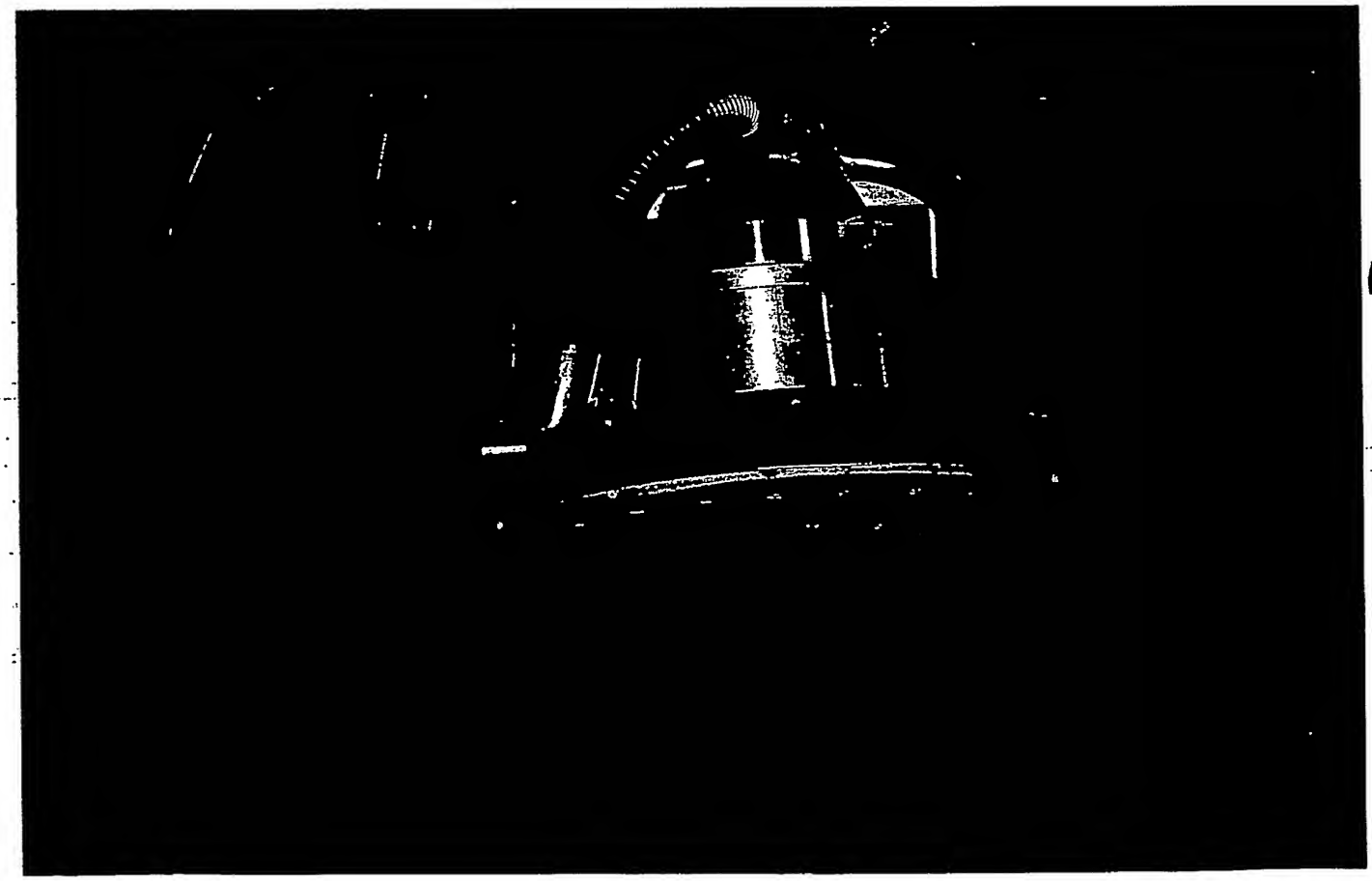

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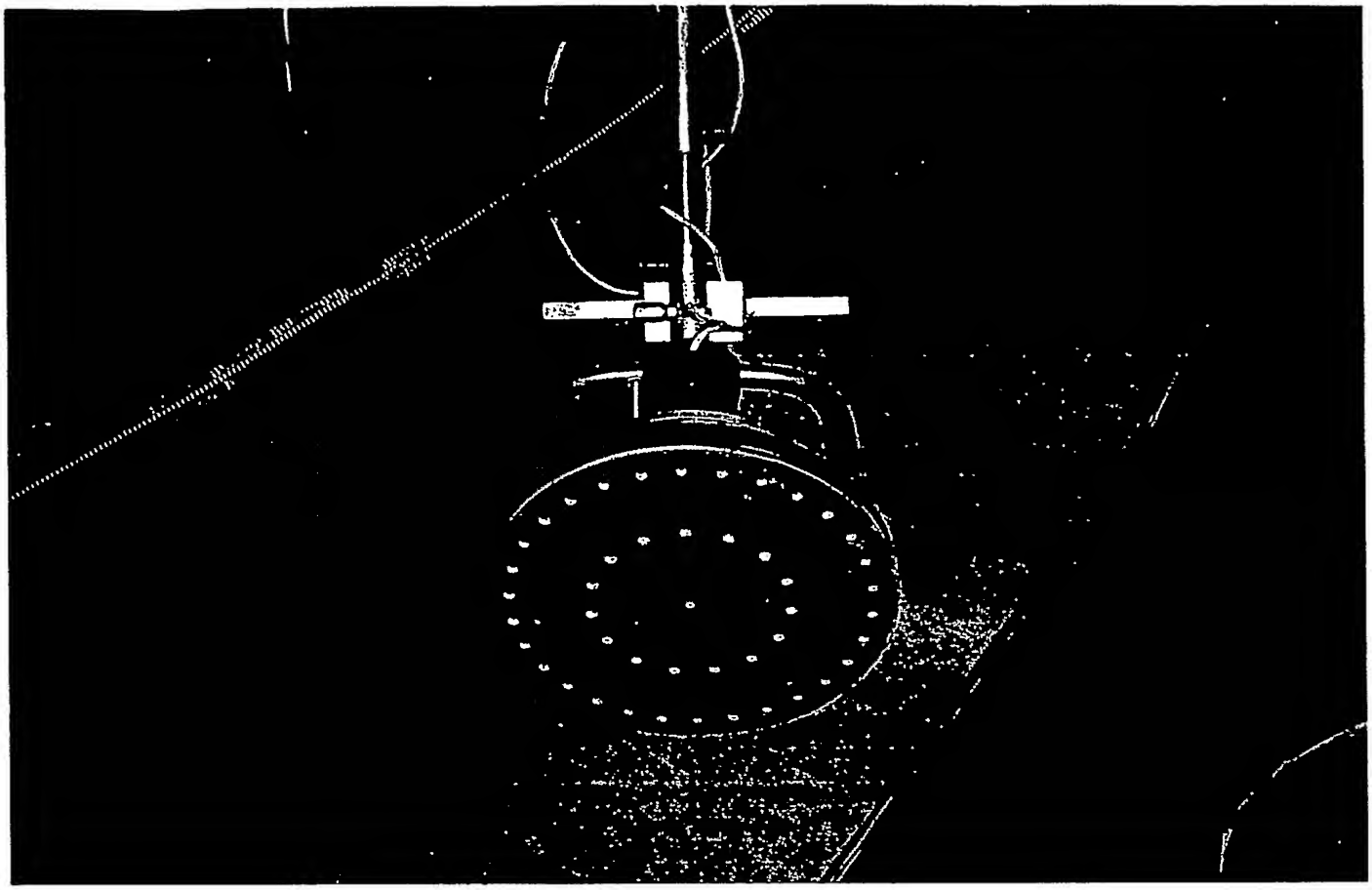
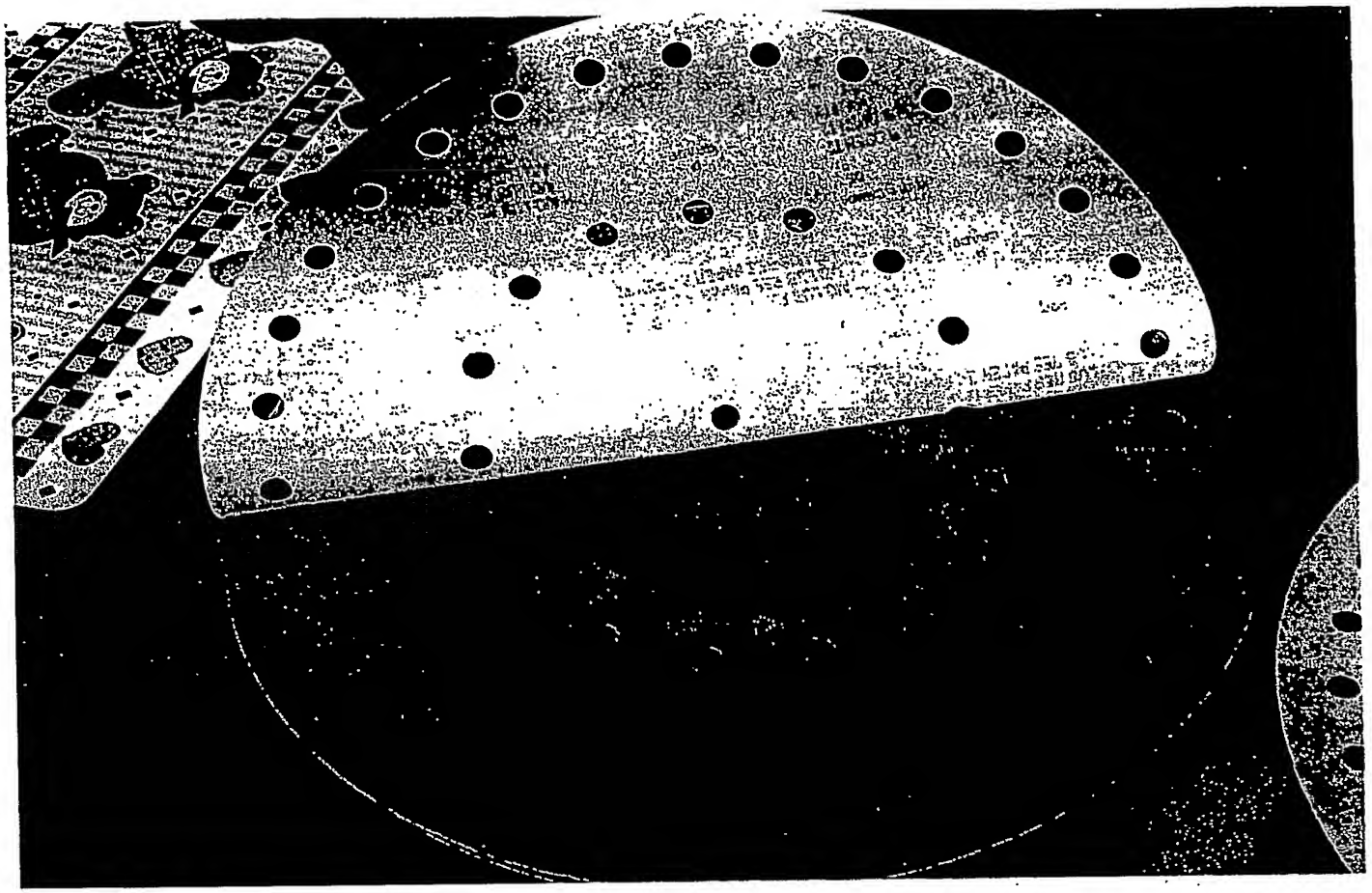


Fig. 7

Fig. 8



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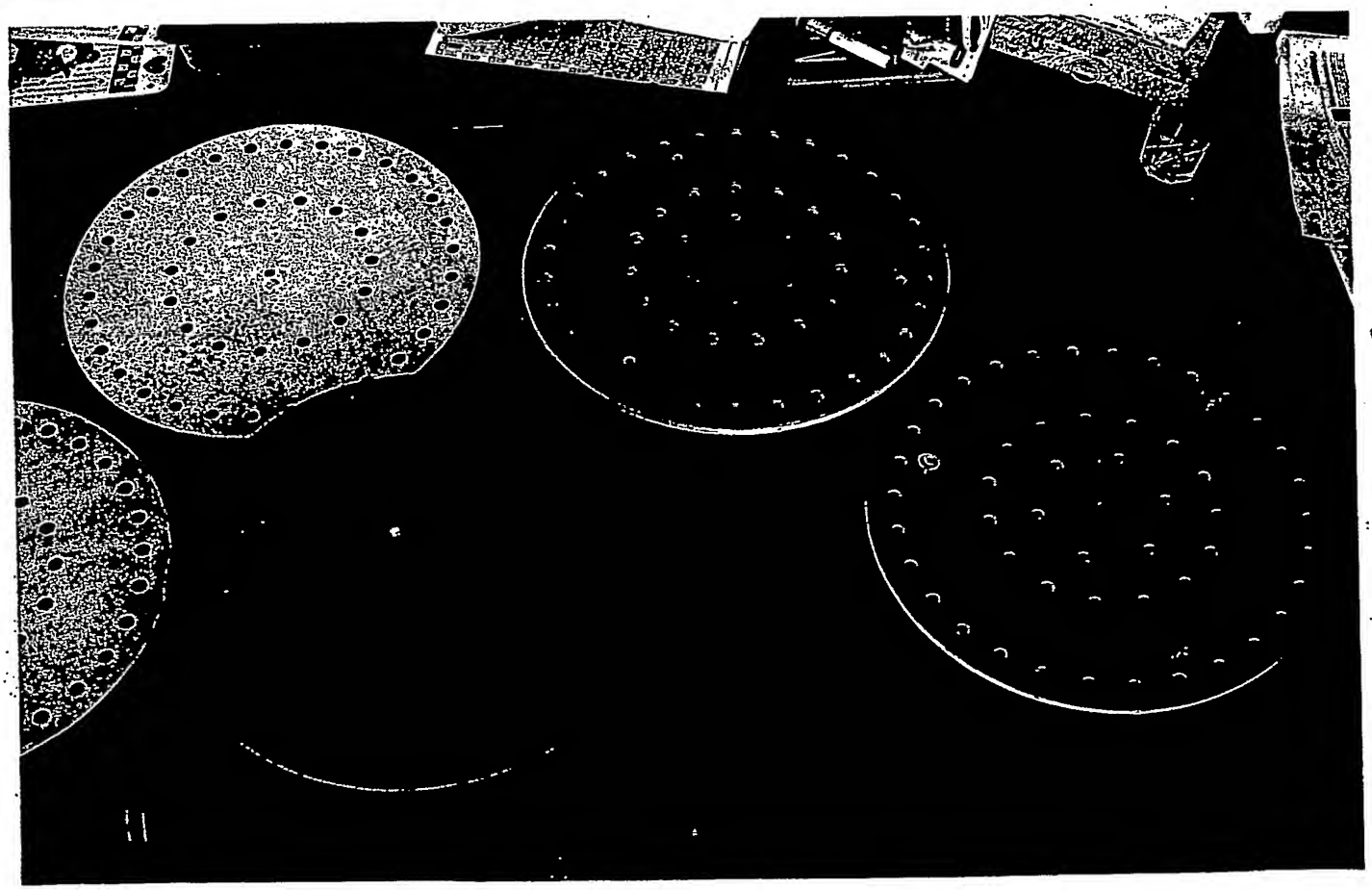
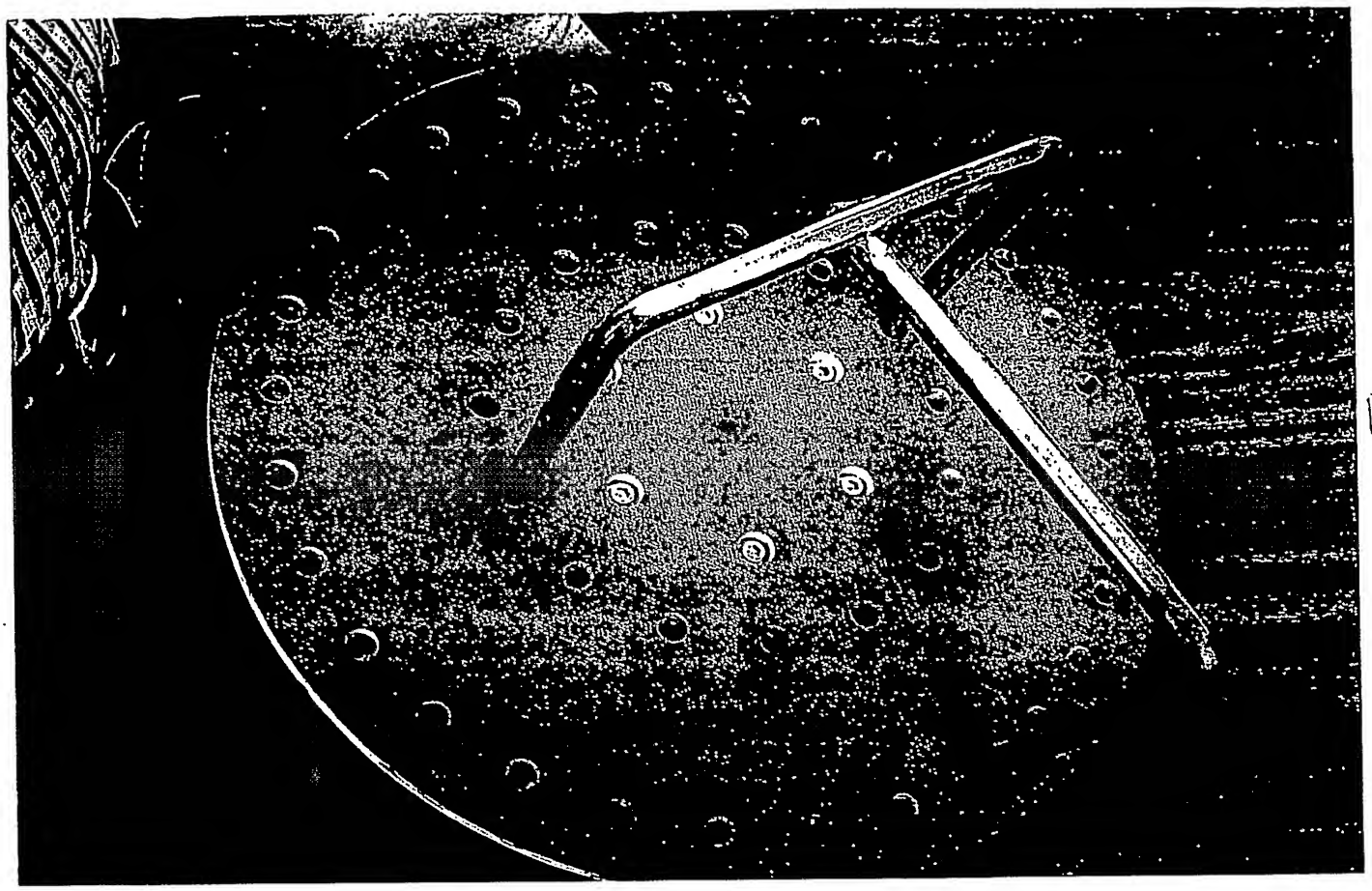


Fig. 1



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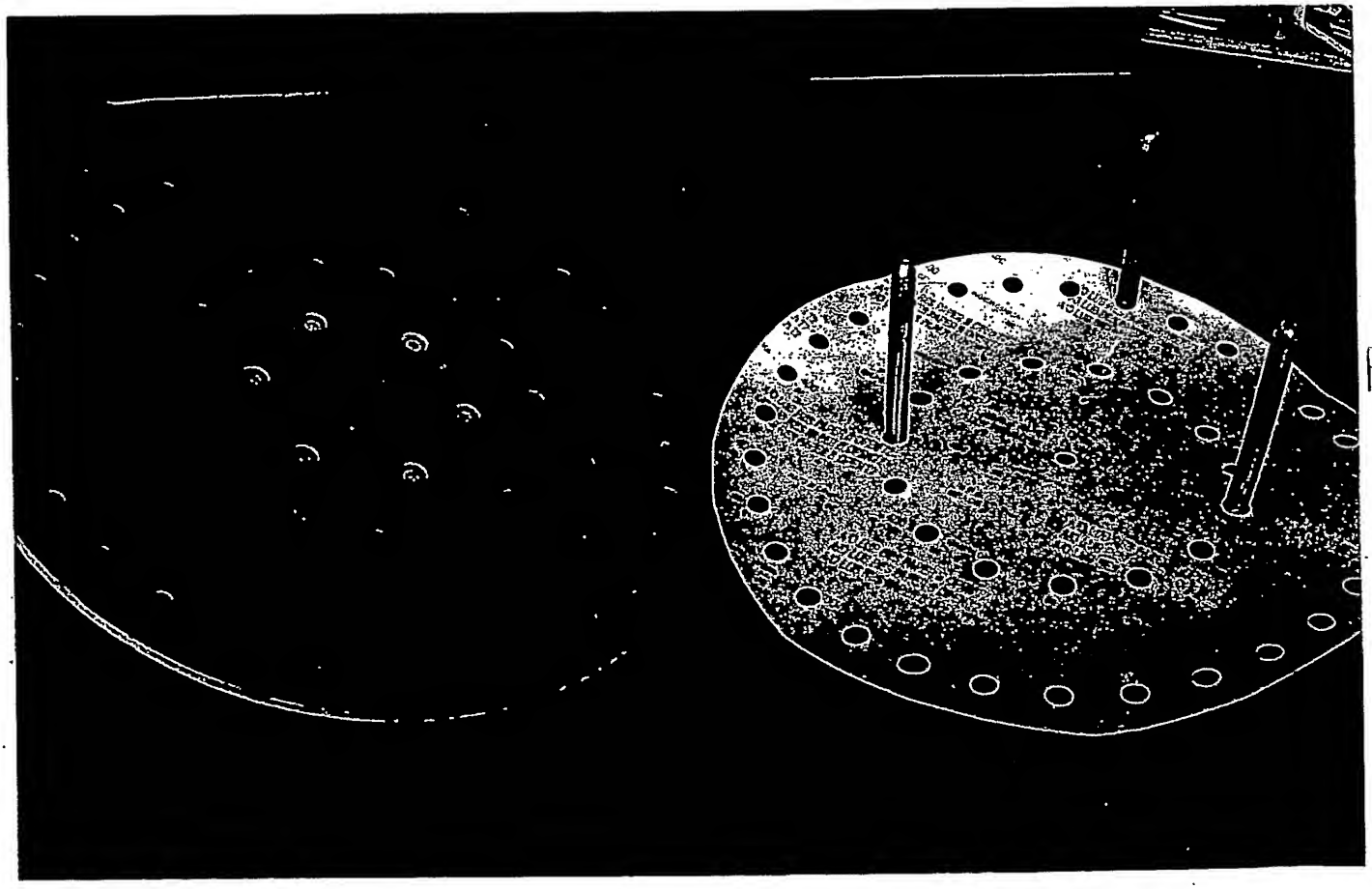

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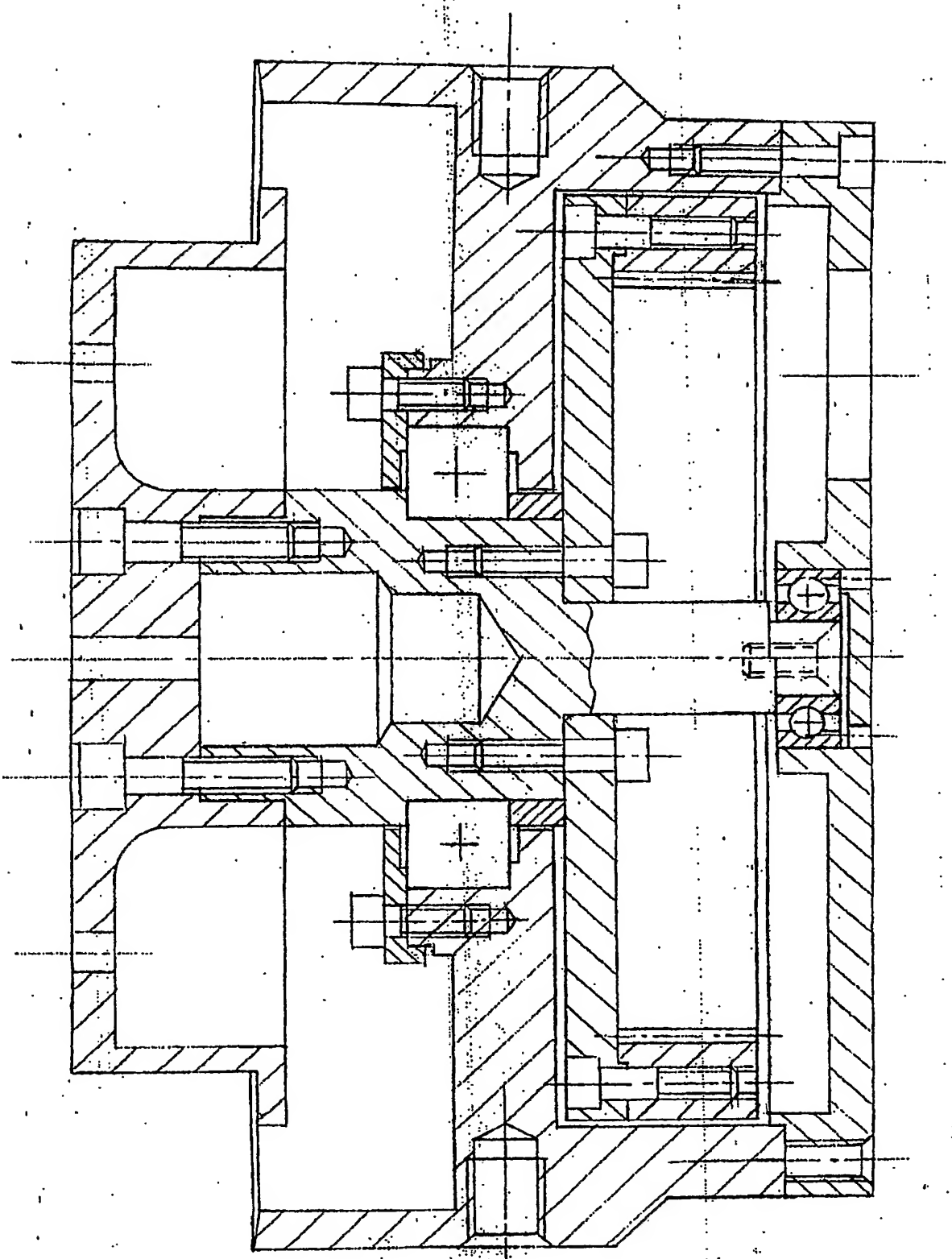

Fig. 13